

## PCT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 18 August 1999 (18.08.99)	
International application No. PCT/EP98/06984	Applicant's or agent's file reference TV980T101E
International filing date (day/month/year) 21 October 1998 (21.10.98)	Priority date (day/month/year) 27 October 1997 (27.10.97)
Applicant TONCELLI, Luca	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

17 May 1999 (17.05.99)



in a notice effecting later election filed with the International Bureau on:

2. The election



was



was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

F. Baechler

Telephone No.: (41-22) 338.83.38

PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only	
PCT/EP 98 / 06 984	
International Application No.	
21 OCT 1998	(21. 10. 1998)
International Filing Date	
EUROPEAN PATENT OFFICE PCT INTERNATIONAL APPLICATION	
Name of receiving Office and "PCT International Application"	
Applicant's or agent's file reference (if desired) (12 characters maximum) TV98OT101E	

<b>Box No. I TITLE OF INVENTION</b>	
Method of producing slabs of granulated stone materials and/or sand bound with a hardenable resin and a shaped sheet for the production concerned	
<b>Box No. II APPLICANT</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	<input checked="" type="checkbox"/> This person is also inventor.
Toncelli Luca Viale Asiago 34 36061 Bassano del Grappa (Vicenza) Italia	Telephone No.
	Facsimile No.
	Teleprinter No.
State (i.e. country) of nationality: <u>Italian</u> IT	State (i.e. country) of residence: <u>Italy</u> IT
This person is applicant for the purposes of: <input checked="" type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
<b>Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)
State (i.e. country) of nationality:	State (i.e. country) of residence:
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
<b>Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE</b>	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	Telephone No.
Caregaro Silvio Via Paris Bordone 9 31100 Treviso ITALY	0422-542944
	Facsimile No. 0422-545044
	Teleprinter No. //
<input type="checkbox"/> Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

## Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

## Regional Patent

- ☐ AP ARIPO Patent: KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, and any other State which is a Contracting State of the Harare Protocol and of the PCT **GH Ghana, GM Gambia, ZW Zimbabwe**
- ☐ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT **CY Cyprus**
- ☐ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) **GW Guinea-Bissau**

## National Patent (if other kind of protection or treatment desired, specify on dotted line):

- |   |   |
|---|---|
| <input type="checkbox"/> AL Albania                               | <input type="checkbox"/> LV Latvia                                    |
| <input type="checkbox"/> AM Armenia                               | <input type="checkbox"/> MD Republic of Moldova                       |
| <input type="checkbox"/> AT Austria                               | <input type="checkbox"/> MG Madagascar                                |
| <input type="checkbox"/> AU Australia                             | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> AZ Azerbaijan                            |   |
| <input type="checkbox"/> BB Barbados                              | <input type="checkbox"/> MN Mongolia                                  |
| <input type="checkbox"/> BG Bulgaria                              | <input type="checkbox"/> MW Malawi                                    |
| <input type="checkbox"/> BR Brazil                                | <input type="checkbox"/> MX Mexico                                    |
| <input type="checkbox"/> BY Belarus                               | <input type="checkbox"/> NO Norway                                    |
| <input checked="" type="checkbox"/> CA Canada                     | <input type="checkbox"/> NZ New Zealand                               |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein  | <input type="checkbox"/> PL Poland                                    |
| <input type="checkbox"/> CN China                                 | <input type="checkbox"/> PT Portugal                                  |
| <input type="checkbox"/> CZ Czech Republic                        | <input type="checkbox"/> RO Romania                                   |
| <input type="checkbox"/> DE Germany                               | <input type="checkbox"/> RU Russian Federation                        |
| <input type="checkbox"/> DK Denmark                               | <input type="checkbox"/> SD Sudan                                     |
| <input type="checkbox"/> EE Estonia                               | <input type="checkbox"/> SE Sweden                                    |
| <input type="checkbox"/> ES Spain                                 | <input type="checkbox"/> SG Singapore                                 |
| <input type="checkbox"/> FI Finland                               | <input type="checkbox"/> SI Slovenia                                  |
| <input type="checkbox"/> GB United Kingdom                        | <input type="checkbox"/> SK Slovakia                                  |
| <input type="checkbox"/> GE Georgia                               | <input checked="" type="checkbox"/> SL Sierra Leone                   |
| <input type="checkbox"/> HU Hungary                               | <input type="checkbox"/> TJ Tajikistan                                |
| <input type="checkbox"/> IL Israel                                | <input type="checkbox"/> TM Turkmenistan                              |
| <input type="checkbox"/> IS Iceland                               | <input checked="" type="checkbox"/> TR Turkey                         |
| <input type="checkbox"/> JP Japan                                 | <input type="checkbox"/> TT Trinidad and Tobago                       |
| <input type="checkbox"/> KE Kenya                                 | <input type="checkbox"/> UA Ukraine                                   |
| <input type="checkbox"/> KG Kyrgyzstan                            | <input type="checkbox"/> UG Uganda                                    |
| <input type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> US United States of America       |
|   |   |
| <input type="checkbox"/> KR Republic of Korea                     | <input type="checkbox"/> UZ Uzbekistan                                |
| <input type="checkbox"/> KZ Kazakstan                             | <input type="checkbox"/> VN Viet Nam                                  |
| <input type="checkbox"/> LK Sri Lanka                             |   |
| <input type="checkbox"/> LR Liberia                               |   |
| <input type="checkbox"/> LS Lesotho                               |   |
| <input type="checkbox"/> LT Lithuania                             |   |
| <input type="checkbox"/> LU Luxembourg                            |   |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐ YU Yugoslavia
- ☐ ZW Zimbabwe
- ☐ GD Grenada

In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except the designation(s) of \_\_\_\_\_

The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

**Supplemental Box***If the Supplemental Box is not used, this sheet need not be included in the request.**Use this box in the following cases:***1. If, in any of the Boxes, the space is insufficient to furnish all the information:***in particular:*

- (i) if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available:
- (ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked:
- (iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America:
- (iv) if, in addition to the agent(s) indicated in Box No. IV, there are further agents:
- (v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "Continuation" or "Continuation-in-part":
- (vi) if there are more than three earlier applications whose priority is claimed:

*in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient;**in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III;**in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;**in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;**in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;**in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;**in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.***2. If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty:***in such case, write "Statement Concerning Non-Prejudicial Disclosures or Exceptions to Lack of Novelty" and furnish that statement below.*

Continuation of box No. IV:

Dragotti Gianfranco  
Via Paris Bordone 9  
31100 Treviso ITALY

Michelotti Giuliano  
Via Paris Bordone 9  
31100 Treviso ITALY

Ferroni Filippo  
Via Paris Bordone 9  
31100 Treviso ITALY

Box No. VI PRIORITY CLAIM		Further priority claims indicated in the Supplemental Box <input type="checkbox"/>	
The priority of the following earlier application(s) is hereby claimed:			
Country (in which, or for which, the application was filed)	Filing Date (day/month/year)	Application No.	Office of filing (only for regional or international application)
item (1) [Italy] IT	(27.10.1997) 27 October 1997	TV97A 000148	
item (2)			
item (3)			
Mark the following check-box if the certified copy of the earlier application is to be issued by the Office which for the purposes of the present international application is the receiving Office (a fee may be required): <input type="checkbox"/> The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s) :			

Box No. VII INTERNATIONAL SEARCHING AUTHORITY	
Choice of International Searching Authority (ISA) (If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen: the two-letter code may be used): ISA /	
Earlier search Fill in where a search (international, international-type or other) by the International Searching Authority has already been carried out or requested and the Authority is now requested to base the international search, to the extent possible, on the results of that earlier search. Identify such search or request either by reference to the relevant application (or the translation thereof) or by reference to the search request. Country (or regional Office):      Date (day/month/year):      Number:	

Box No. VIII CHECK LIST	
This international application contains the following number of sheets: 1. request : 4 sheets 2. description : 8 sheets 3. claims : 2 sheets 4. abstract : 1 sheets 5. drawings : 4 sheets <b>Total : 19 sheets</b>	This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> separate signed power of attorney 2. <input type="checkbox"/> copy of general power of attorney 3. <input type="checkbox"/> statement explaining lack of signature 4. <input checked="" type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 5. <input type="checkbox"/> fee calculation sheet 6. <input type="checkbox"/> separate indications concerning deposited microorganisms 7. <input type="checkbox"/> nucleotide and/or amino acid sequence listing (diskette) 8. <input type="checkbox"/> other (specify):

Figure No. 1 of the drawings (if any) should accompany the abstract when it is published.

Box No. IX SIGNATURE OF APPLICANT OR AGENT	
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).	
Treviso, 19th October 1998 Ing. Silvio Caregaro	

For receiving Office use only		2. Drawings: <input checked="" type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:	21 OCT 1998 (21.10.1998)	
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority specified by the applicant: ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

From the:  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

DRAGOTTI & ASSOCIATI SRL  
Via Paris Bordone, 9  
31100 TREVISO  
ITALIE

RICEVUTO

23 AGO. 1999

Risp.....

PCT

WRITTEN OPINION

(PCT Rule 66)

Date of mailing  
(day/month/year)

18. 08. 99

Applicant's or agent's file reference

TV980T101E

REPLY DUE

within 3 month(s)  
from the above date of mailing

International application No.

PCT/EP98/06984

International filing date (day/month/year)

21/10/1998

Priority date (day/month/year)

27/10/1997

International Patent Classification (IPC) or both national classification and IPC

B29C67/24

Applicant

TONCELLI, Luca

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☐ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain document cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

**When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also:** For an additional opportunity to submit amendments, see Rule 66.4.  
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.  
For an informal communication with the examiner, see Rule 66.6.

**If no reply is filed**, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 27/02/2000.

Name and mailing address of the international preliminary examining authority:

European Patent Office  
D-80298 Munich  
Tel. (+49-89) 2399-0 Tx: 523656 epmu d  
Fax: (+49-89) 2399-4465

Authorized officer / Examiner

De Waard, W

23552918

Formalities officer (incl. extension of time limits)

Vatel, M

Telephone No. (+49-89) 2399 8225



**I. Basis of the opinion**

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

**Description, pages:**

1-8 as originally filed

**Claims, No.:**

1-17 as originally filed

**Drawings, sheets:**

1/4-4/4 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item VII**

**Certain defects in the international application**

1. Reference signs not mentioned in the description should not appear in the drawings (Rule 11.13(I) PCT)
2. Reference sign 21 on page 5, line 8 should probably read "24" (compare figure 1).

**Re Item VIII**

**Certain observations on the international application**

The statement on page 6, lines 3, 4 that the **space** prevents the contact cannot be followed. It appears that the rim prevents said contact, particularly with respect to figure 5.



## PATENT COOPERATION TREATY

PCT

REC'D 25 NOV 1999

WIPO PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference TV980T101E	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP98/06984	International filing date (day/month/year) 21/10/1998	Priority date (day/month/year) 27/10/1997
International Patent Classification (IPC) or national classification and IPC B29C67/24		
Applicant TONCELLI, Luca		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 17/05/1999	Date of completion of this report 23. 11. 99
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer De Waard, W Telephone No. +49 89 2399 2918 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP98/06984

## I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

### Description, pages:

1-5,7,8 as originally filed

6 as received on 06/11/1999 with letter of 03/11/1999

### Claims, No.:

1-17 as originally filed

### Drawings, sheets:

2/4-4/4 as originally filed

1/4 as received on 06/11/1999 with letter of 03/11/1999

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP98/06984

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-17
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-17
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-17
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The invention relates to a method of producing slabs of granulated stone material or sand bound with a hardenable resin which mixture is spread onto a lower sheet and then covered by an upper sheet.

Such a method is known from EP-A-786 325 (hereinafter referred to as D1).

2. The method according to the invention differs from the known method, in essence, that the lower sheet has a rim portion which determines the height or thickness of the slab to be produced.

This feature is neither known from the other cited documents nor is therein hinted at and, therefore, not obvious to a person skilled in the art.

As a consequence, the subject matter of claim 1 is considered to involve an inventive step (Article 33(3) PCT).

3. The same consideration holds for the independent product claim 9.
4. Dependent claims 2-8 and 10-17 define further embodiments of the invention and involve, therefore, an inventive step too.

between the thickness S of the mixture 130 and the thickness or height X of the peripheral rim 120A of the lower sheet 120.

As will be seen from the following, ~~the space 100 prevents~~ physical contact between the two corresponding edges <sup>132A and 120A</sup> of the two sheets 132 and 120\* and defines a cavity of regular shape and very limited depth into which the excess mixture can escape at the compaction stage. After the slab has hardened, this excess mixture constitutes a flash which can easily be removed during the finishing of the completed slab.

As can also be seen in Figure 3, the lower sheet is shaped and comprises a flat base 120B and the aforementioned frame or rim 120A which has an inclination of 45°; in this embodiment the portion 120E of the final slab enclosed between the inclined surface 120C and the vertical section identified by the broken line 120D constitutes waste material in the sense that it will have to be removed from the final slab at the finishing grinding stage, bearing in mind, in particular, that the surface in contact with the base 120B of the lower rubber sheet is that which constitutes the visible face in the final slab.

It will thus also be understood why the inclination of the surface of the peripheral side or frame 120A of the lower sheet cannot adopt large values (which favour the separation of the lower rubber sheet) since an increase in this inclination increases the effect of the waste portions 120E. With regard to the material of the two sheets 132 and 120, it is worth noting that the lower sheet should preferably be inextensible so as to withstand the tensile forces to which it is subject during pressing, and which are generated by the horizontal thrust on the shaped rim.

The lower sheet preferably has a composite structure in the sense that it is constituted by an intermediate layer 120M of cloth or fabric of non-deformable material such as Kevlar, polyester or nylon, enclosed between two rubber layers. Moreover, to prevent hysteresis phenomena (that is, persistence of any extension), the cloth or fabric undergoes a pre-tensioning process.

Finally, the rubber sheet should also be able to withstand the temperatures of the hot catalytic hardening step which are of the order of 80-150°C.

With regard to the upper sheet 132, however, this does not necessarily have to be composite in the same manner as the lower sheet but is preferably made of rubber of the same composition as that forming the rubber layers covering the inextensible cloth of the lower sheet.

The lower sheet should also allow the peripheral rim to be gripped by pincer means as provided for, for example, in the method and plant described in International Patent Application No. PCT/EP98/02258 filed on April 11, 1998 in which the assembly constituted by the lower and the upper sheet which enclose the layer of mixture is gripped in the region of the lower edge for the handling operations to which the assembly has to be subjected on the production line.

\* is prevented by the provision of the space 100, which

1/4

Fig. 1

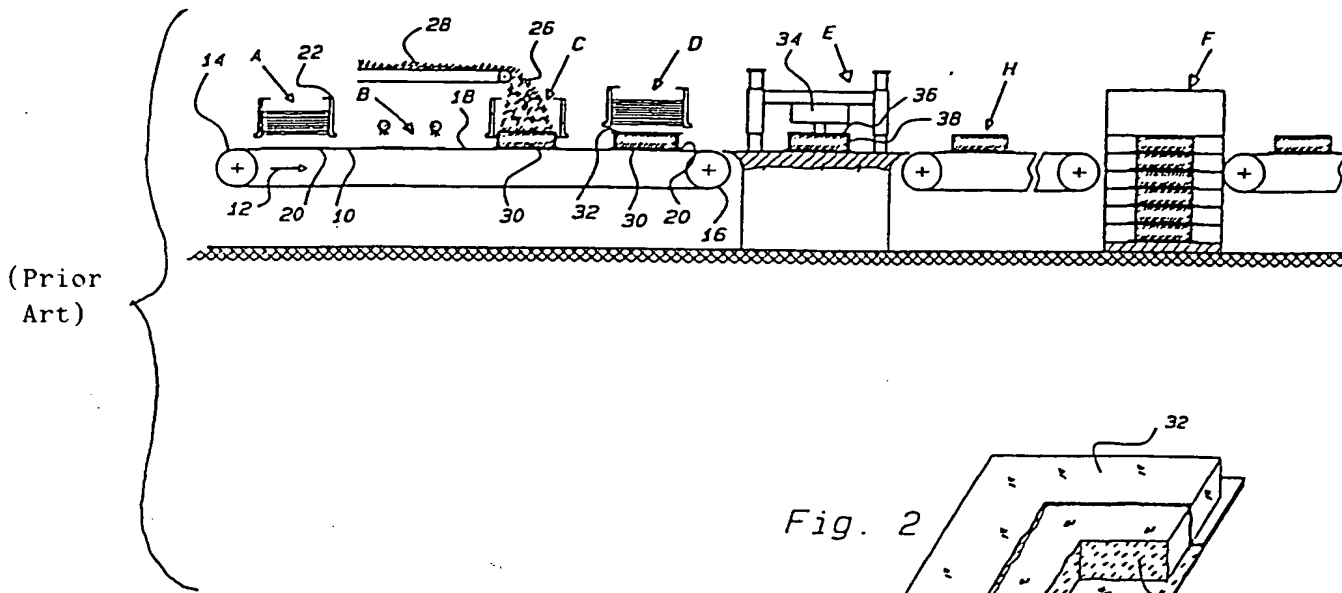


Fig. 2

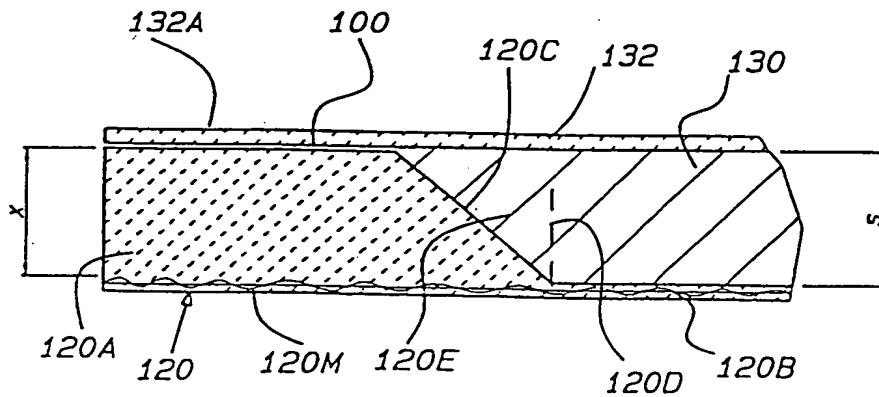
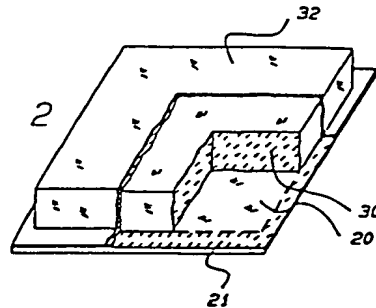


Fig. 3

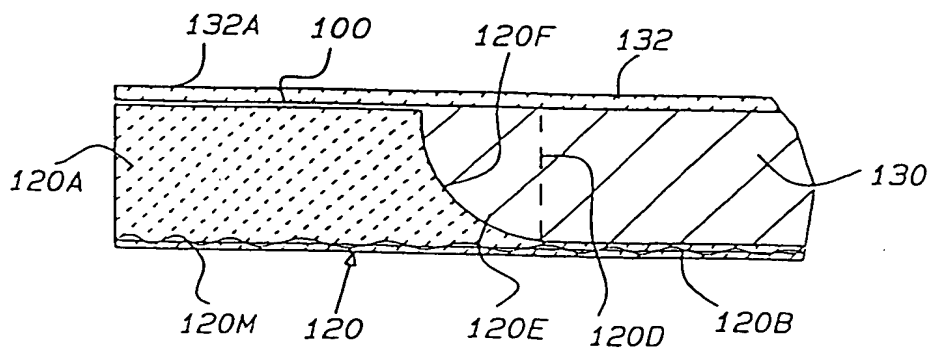


Fig. 4

AMENDED SHEET

between the thickness  $S$  of the mixture 130 and the thickness or height  $X$  of the peripheral rim 120A of the lower sheet 120.

As will be seen from the following, the space 100 prevents physical contact between the two corresponding edges of the two sheets 132 and 120 and defines a cavity of regular shape and very limited depth into which the excess mixture can escape at the compaction stage. After the slab has hardened, this excess mixture constitutes a flash which can easily be removed during the finishing of the completed slab.

As can also be seen in Figure 3, the lower sheet is shaped and comprises a flat base 120B and the aforementioned frame or rim 120A which has an inclination of  $45^\circ$ ; in this embodiment the portion 120E of the final slab enclosed between the inclined surface 120C and the vertical section identified by the broken line 120D constitutes waste material in the sense that it will have to be removed from the final slab at the finishing grinding stage, bearing in mind, in particular, that the surface in contact with the base 120B of the lower rubber sheet is that which constitutes the visible face in the final slab.

It will thus also be understood why the inclination of the surface of the peripheral side or frame 120A of the lower sheet cannot adopt large values (which favour the separation of the lower rubber sheet) since an increase in this inclination increases the effect of the waste portions 120E. With regard to the material of the two sheets 132 and 120, it is worth noting that the lower sheet should preferably be inextensible so as to withstand the tensile forces to which it is subject during pressing, and which are generated by the horizontal thrust on the shaped rim.

The lower sheet preferably has a composite structure in the sense that it is constituted by an intermediate layer 120M of cloth or fabric of non-deformable material such as Kevlar, polyester or nylon, enclosed between two rubber layers. Moreover, to prevent hysteresis phenomena (that is, persistence of any extension), the cloth or fabric undergoes a pre-tensioning process.

Finally, the rubber sheet should also be able to withstand the temperatures of the hot catalytic hardening step which are of the order of  $80-150^\circ\text{C}$ .

With regard to the upper sheet 132, however, this does not necessarily have to be composite in the same manner as the lower sheet but is preferably made of rubber of the same composition as that forming the rubber layers covering the inextensible cloth of the lower sheet.

The lower sheet should also allow the peripheral rim to be gripped by pincer means as provided for, for example, in the method and plant described in International Patent Application No. PCT/EP98/02258 filed on April 11, 1998 in which the assembly constituted by the lower and the upper sheet which enclose the layer of mixture is gripped in the region of the lower edge for the handling operations to which the assembly has to be subjected on the production line.

1/4

Fig. 1

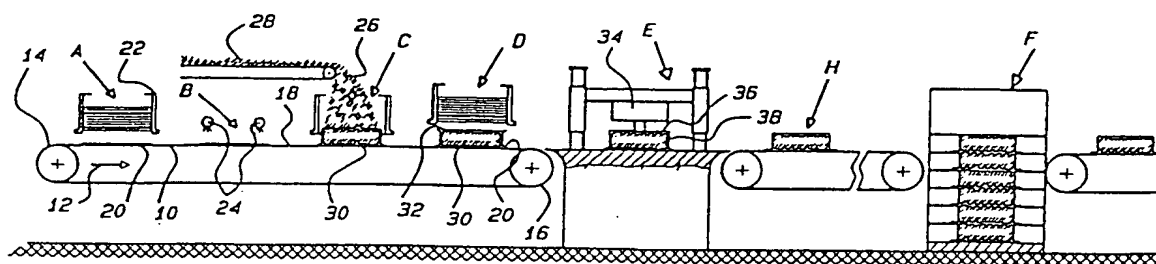


Fig. 2

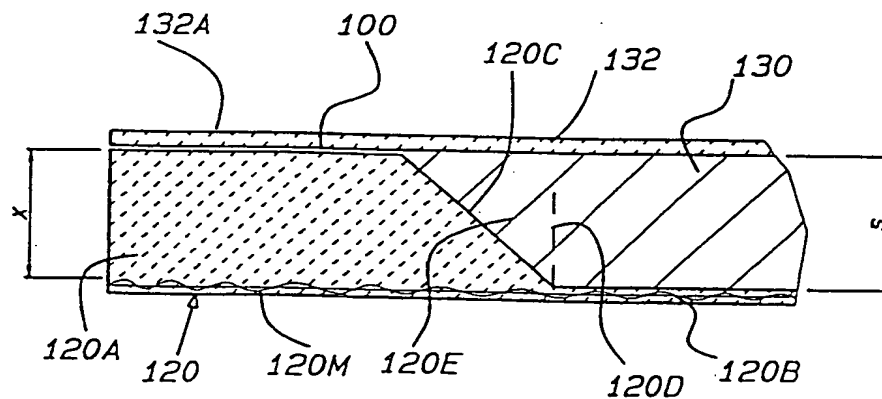
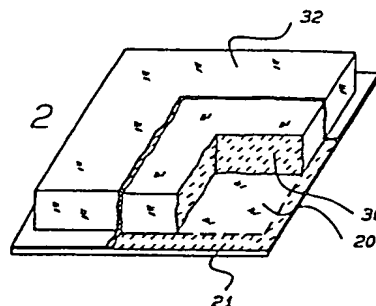


Fig. 3

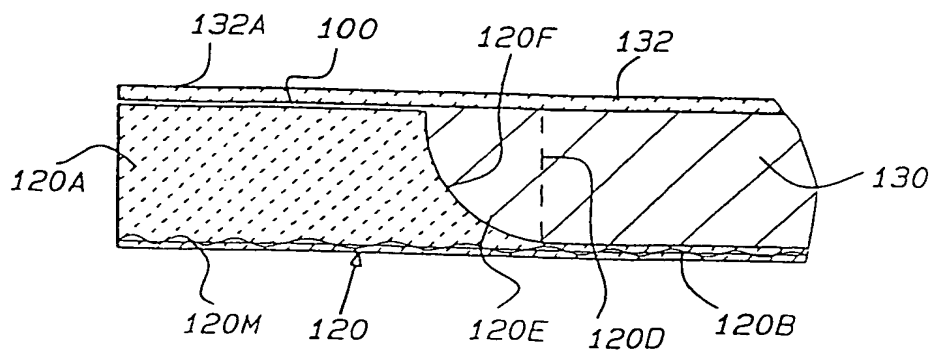


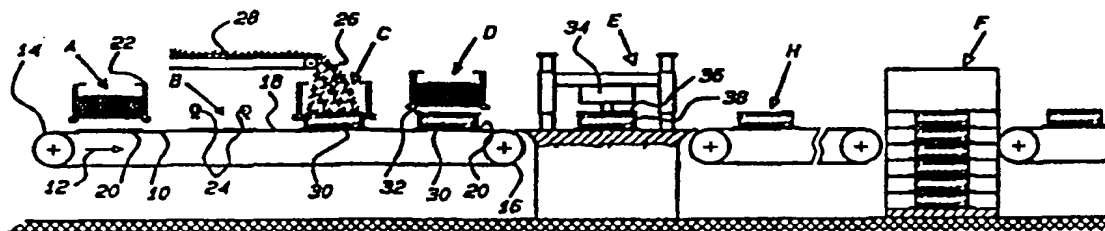
Fig. 4



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: **METHOD OF PRODUCING SLABS OF GRANULATED STONE MATERIALS AND/OR SAND BOUND WITH A HARDENABLE RESIN AND A SHAPED SHEET FOR THE PRODUCTION CONCERNED**



## (57) Abstract

In the method of producing slabs made of granulated stone materials and/or sand bound with a hardenable resin by compaction under vacuum and subsequent hardening of the resulting raw slab, in which, before the vibratory compaction, the mixture (26) is spread with substantially uniform thickness on a support (20), the said support (20) being protected by a highly resilient sheet material, the flat configuration of the lower sheet is replaced by a shaped configuration comprising a flat base (120b) and a peripheral frame (120a) projecting from the flat base (120b) for a predetermined height so as to define a seat of dimensions corresponding in plan to those of the slab to be produced, the aforementioned peripheral frame (120a) having a height which is lower by a predetermined amount than that of the final slab to be produced so that, when the completely flat upper sheet (132) is placed on the upper surface of the mixture (26), a space (100a) of predetermined depth remains between the peripheral edge of the upper sheet and the top of the aforementioned frame.

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/EP 98/06984

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 B29C67/24

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 786 325 A (TONCELLI MARCELLO) 30 July 1997 cited in the application see the whole document ---	1, 2, 4, 9, 13
A	FR 1 496 341 A (L. R. MANGRUM) 21 December 1967 see the whole document see page 6, column 2, line 12 - page 6, column 2, line 45 see page 7, column 1, line 43 - page 7, column 1, line 54 see figure 5 ---	1, 9
A	WO 92 10349 A (DRAZIL JAROMIR VACLAV) 25 June 1992 see the whole document -----	1, 8, 9, 16

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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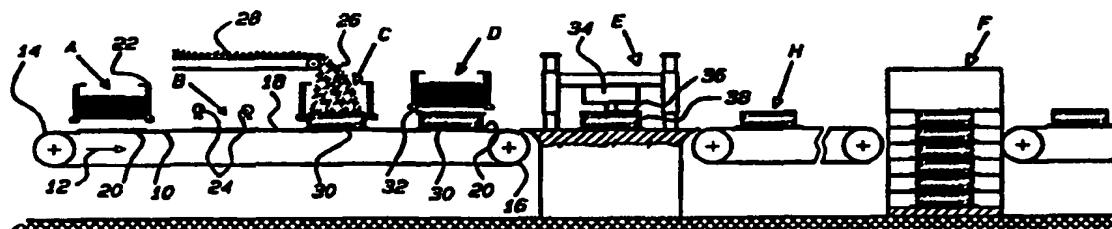
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			CA	2196119 A	30-07-1997
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(54) Title: METHOD OF PRODUCING SLABS OF GRANULATED STONE MATERIALS AND/OR SAND BOUND WITH A HARDENABLE RESIN AND A SHAPED SHEET FOR THE PRODUCTION CONCERNED



## (57) Abstract

In the method of producing slabs made of granulated stone materials and/or sand bound with a hardenable resin by compaction under vacuum and subsequent hardening of the resulting raw slab, in which, before the vibratory compaction, the mixture (26) is spread with substantially uniform thickness on a support (20), the said support (20) being protected by a highly resilient sheet material, the flat configuration of the lower sheet is replaced by a shaped configuration comprising a flat base (120b) and a peripheral frame (120a) projecting from the flat base (120b) for a predetermined height so as to define a seat of dimensions corresponding in plan to those of the slab to be produced, the aforementioned peripheral frame (120a) having a height which is lower by a predetermined amount than that of the final slab to be produced so that, when the completely flat upper sheet (132) is placed on the upper surface of the mixture (26), a space (100a) of predetermined depth remains between the peripheral edge of the upper sheet and the top of the aforementioned frame.

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**"Method of producing slabs of granulated stone materials and/or sand bound with a hardenable resin and a shaped sheet for the production concerned"**

The present invention relates to the production of slab products made of a granulated stone material or sand bound with a hardenable resin and, more specifically, to an improvement in the production line thereof.

The method of producing these slabs to which the present invention relates is the method according to which a mixture constituted by granulated material of a selected size and by synthetic resin is deposited in metered quantities on a conveyor belt which is advanced to a forming station (in which the mixture is subjected to a compaction operation under vacuum with simultaneous application of a vibration of predetermined frequency) and subsequently to a station in which the resin is hardened (preferably by the action of a catalyst and/or heat).

Upstream of the forming station, the upper surface of the metered quantity of mixture deposited on the conveyor belt is covered by a sheet or layer of protective material which prevents the pressure plate of the press from being soiled by the mixture.

In the past, this protective sheet material was paper, the use of which, however, was accompanied by some problems collateral to and downstream of the actual production line but none the less of considerable importance.

In fact, after the hardening of the resin, the paper sheet remained strongly adhering to the surface of the hardened slab and was quite difficult to remove therefrom so that a suitable operation for the mechanical removal of the protective paper was required during the finishing of the slab.

Subsequently, an improvement (described and claimed in European published Patent Application No. 0 786 325) was introduced, according to which the paper layer or sheet was replaced by a sheet of resilient material, preferably rubber.

Upon completion of the hardening of the binding resin, the rubber sheet can thus in fact be pulled away from the surface of the finished slab and subsequently re-used.

In the preferred embodiment, the support on which the mixture is deposited before being transferred to the station for compaction under vacuum and with vibration is also protected by a similar sheet of resilient material, particularly rubber.

After the forming stage, the mixture deposited on the support and enclosed between the two rubber sheets is in the form of a slab at the edges of which the two protective rubber sheets are joined together by their respective overlapping edges, substantially completely enclosing the raw slab which has been formed but not yet subjected to the step of hardening of the resin binder.

Since, during compaction, a portion of the mixture, albeit a minimal portion, inevitably forms a flash interposed between the two edges, this flash forms deposits on the rubber sheets after the resin binder has been hardened and these deposits are difficult to remove because the two rubber edges do not remain in contact with one another during the hardening step, so that the as yet unhardened flash is detached from the body of the product.

To prevent this problem, again in the previously known method, a release liquid is applied, immediately before use on the production line, to the two edges which are intended to meet.

In spite of these measures, however, operations to clean the two rubber sheets, particularly in the region of the meeting edges are still necessary; although these operations are certainly less onerous than those previously connected with the removal of protective paper, they nevertheless necessitate a further operation in the production cycle in addition to that of the application of the release liquid to the two edges of the rubber sheets.

Moreover, in order to meet the peripheral edge of the lower sheet in the region of the edges of the formed raw mixture and of the adjacent side thereof, the peripheral edge of the upper rubber sheet has to be deformed, overcoming the natural resilience which would tend to return it to the completely flat configuration.

The main object of the present invention is to solve these problems in an industrially advantageous manner.

A more specific object of the present invention is to improve the method and plant described above so as to avoid the need for the application of release liquid and at the same time to prevent the formation of deposits on the rubber sheets, which necessitate laborious cleaning operations.

These objects are achieved by the present invention by modifications both to the sheets and to the method of operation.

In the first place, the flat configuration of the lower sheet is replaced by a shaped configuration comprising a flat base and a peripheral frame projecting from the flat base for a predetermined height so as to define a seat of dimensions corresponding in plan to those of the slab to be produced, but the aforementioned peripheral frame is given a height which is lower by a predetermined amount than that of the final slab to be produced so that, after the compaction step, a space of predetermined depth remains between the peripheral edge of the upper sheet and the top of the aforementioned frame.

Excess mixture material is disposed in this space of predetermined depth during the step of vibratory compaction under vacuum and this material then remains attached to the edge of the slab during the hardening stage. When the final slab is pulled free of the two rubber sheets after

the hardening of the resin binder, the hardened raw slab obtained has a peripheral frame of hardened material which can easily be removed during normal finishing operations for a slab of stony material.

As will become clearer from the detailed description with reference to the drawings, with the present invention, when the upper sheet is pulled away from the now hardened slab, the material forming the slab is easily separated from the rubber sheet since the force applied by the sheet to the surface of the slab is tangential so that, even at the edges of the slab, the rubber sheet is separated in the same manner and with the same results (that is, without the material of the slab remaining adhering to the adjacent surface of the rubber sheet) as were achieved for the central portion of the rubber sheet in the known method.

With reference now more specifically to the shaped configuration of the lower sheet, that is, the sheet holding the mixture initially deposited, its peripheral rim or, more precisely, the inner surface thereof which restrains the mixture material, may adopt various configurations which are based on an analysis of the forces acting on the inner surface of the rim and at the same time on the consequences with regard to waste material at the edge of the slab.

In other words, the inner surface of the rim or frame of the lower sheet may adopt a shape or orientation which varies from a substantially vertical shape (in which case, the lower sheet is shaped like a box open at the top and with side walls perpendicular to the base surface) to a shape inclined in various ways (in which the lower sheet again forms a kind of box having an edge or frame with a flared arrangement).

Now, the force acting on the inner surface of the rim is approximately perpendicular thereto and, for inclined surfaces in general, can be broken down into two components, that is, a horizontal component and a vertical component, respectively. The horizontal component is that which causes deformation of the resilient rim (which results in a force opposing the detachment of the rubber from the adjacent surface of the slab).

On the other hand, the greater the outward inclination of the inner surface, the more easily the slab can be extracted.

With regard to ease of extraction of the slab, and in order to create a force component which squeezes the rubber rim towards the press plate, an inner surface of the rim of the lower sheet inclined outwardly as much as possible (basically with an external angle of between  $90^\circ$  and  $0^\circ$ ) therefore seems preferable.

However, a greater inclination of the inner surface of the rim of the lower sheet corresponds to a greater width of the corresponding strip of waste material, whereas, if the peripheral rim is



perpendicular to the base surface of the sheet, the waste material is reduced to the maximum possible extent, but the aforesaid horizontal component increases to the maximum extent.

The inner surface of the frame or rim of the lower sheet should therefore be shaped in a manner such as to increase the vertical component or force to the maximum possible extent and at the same time to reduce the amount of waste material on the edge of the hardened slab to the maximum possible extent. This situation generally corresponds to a surface inclined at an angle of less than 90° and preferably of the order of 45°.

An upwardly concave curved shape of the inner or restraining surface of the rim or frame is also possible; in this case, most of the force is in fact discharged vertically onto the base rather than laterally.

These and other aspects and advantages of the present invention will become clearer from the following detailed description given with reference to the appended drawings, in which:

Figure 1 is a schematic view of the conventional production line to which the present invention is applied,

Figure 2 is a schematic view of the production step in which the mixture of granulated material and binding resin is enclosed in an envelope formed by two rubber sheets,

Figure 3 is a partial section showing the edge portion of the corresponding envelope in the case of the present invention, on an enlarged scale, and

Figure 3A is a view similar to Figure 3 which shows the configuration actually adopted by the aforesaid edge portion in the implementation of the present invention,

Figure 4 is a view similar to Figure 3 showing a variant of the invention and, similarly, views of further variants of the present invention are shown in Figures 5, 6, 7 and 8,

Figures 9, 10 and 11 are schematic views of a further variant of the invention.

Figure 1 shows a line for producing slabs bound with resin from a mixture constituted by granulated material or sand and binding resin. This is the production line described in European published Patent Application No. 0 786 325 mentioned above, the text of which should be referred to for full information with regard to the line.

It suffices herein to note that natural or synthetic rubber sheets, indicated 20, are placed at regular intervals on a conveyor belt 10 and constitute the lower sheets on which a metered quantity of mixture 26 prepared beforehand from granulated stone material and/or sand and hardenable binding resin is deposited in the station C, the metered quantity being disposed on the upper surface of the sheet 20 in the form of a layer 30 of uniform thickness having substantially the dimensions of the final slab to be produced.

In a station D downstream of the metering station C, a second rubber sheet 32 (the upper sheet), having dimensions larger than those of the layer of mixture 30 (as does the lower sheet 20) is deposited on the upper surface of the layer 30 and the peripheral edges of the two sheets 20 and 32 are made to meet (by deformation of the peripheral edge of the upper sheet 32) to form an envelope which encloses the layer of mixture 30 in the manner shown in Figure 2.

It should be pointed out that, in the production line now described, the facing peripheral edges of the two sheets 20 and 32 are sprayed beforehand with a release liquid (as indicated by the reference numeral 21) and that, in the view of Figure 2, the upper sheet is deformed so as to fit perfectly against the adjacent surface of the layer 30 which does not actually happen since the natural resilience of the sheet 32 opposes such a deformation of the upper sheet 32 (in the absence of means performing this specific function).

In fact, the peripheral edge of the upper sheet 32 will therefore adopt a downwardly inclined arrangement, leaving an irregular space which is filled by excess mixture during vibratory compaction, even though the compaction press has a compaction and pressure plate which is shaped so as to fit closely against the upper sheet even in the region of the sides of the layer 30.

With reference now to Figure 3, this shows in section a portion of the envelope formed in the case of the present invention by the upper and lower rubber sheets and by the layer of mixture enclosed between them.

For convenience of reference, the reference numerals used in Figures 1 and 2 are used again, increased by 100, for corresponding components in Figure 3.

Thus, in Figure 3, the upper rubber sheet is indicated 132, the lower rubber sheet is generally indicated 120, and the mixture, which at the output of the station for vibratory compaction under vacuum (indicated E in Figure 1) is enclosed between the two aforesaid sheets, is indicated 130.

Figure 3A shows the same mixture before it enters the vibratory compaction station so that it can be appreciated that, before this operation, the mixture has a thickness  $S_0$  decidedly greater than  $S$  and, that a space 100A, also defined by a temporary deformation of the peripheral edge 132A of the upper sheet 132, remains in the region of the outer edge of the mixture between the upper rubber sheet 132 and the peripheral rim or frame 120A of the lower sheet 120.

As can be seen from Figure 3, the upper sheet 132 is arranged in a completely flat configuration on the upper surface of the layer of compacted mixture 130 on which it bears whilst, in the region of the peripheral edge 132A, it is separated from the peripheral rim or frame 120A of the lower sheet 120 by a space or cavity 100 of predetermined depth equal to the difference  $h$

between the thickness S of the mixture 130 and the thickness or height X of the peripheral rim 120A of the lower sheet 120.

As will be seen from the following, the space 100 prevents physical contact between the two corresponding edges of the two sheets 132 and 120 and defines a cavity of regular shape and very limited depth into which the excess mixture can escape at the compaction stage. After the slab has hardened, this excess mixture constitutes a flash which can easily be removed during the finishing of the completed slab.

As can also be seen in Figure 3, the lower sheet is shaped and comprises a flat base 120B and the aforementioned frame or rim 120A which has an inclination of 45°; in this embodiment the portion 120E of the final slab enclosed between the inclined surface 120C and the vertical section identified by the broken line 120D constitutes waste material in the sense that it will have to be removed from the final slab at the finishing grinding stage, bearing in mind, in particular, that the surface in contact with the base 120B of the lower rubber sheet is that which constitutes the visible face in the final slab.

It will thus also be understood why the inclination of the surface of the peripheral side or frame 120A of the lower sheet cannot adopt large values (which favour the separation of the lower rubber sheet) since an increase in this inclination increases the effect of the waste portions 120E. With regard to the material of the two sheets 132 and 120, it is worth noting that the lower sheet should preferably be inextensible so as to withstand the tensile forces to which it is subject during pressing, and which are generated by the horizontal thrust on the shaped rim.

The lower sheet preferably has a composite structure in the sense that it is constituted by an intermediate layer 120M of cloth or fabric of non-deformable material such as Kevlar, polyester or nylon, enclosed between two rubber layers. Moreover, to prevent hysteresis phenomena (that is, persistence of any extension), the cloth or fabric undergoes a pre-tensioning process.

Finally, the rubber sheet should also be able to withstand the temperatures of the hot catalytic hardening step which are of the order of 80-150°C.

With regard to the upper sheet 132, however, this does not necessarily have to be composite in the same manner as the lower sheet but is preferably made of rubber of the same composition as that forming the rubber layers covering the inextensible cloth of the lower sheet.

The lower sheet should also allow the peripheral rim to be gripped by pincer means as provided for, for example, in the method and plant described in International Patent Application No. PCT/EP98/02258 filed on April 11, 1998 in which the assembly constituted by the lower and the upper sheet which enclose the layer of mixture is gripped in the region of the lower edge for the handling operations to which the assembly has to be subjected on the production line.

In this case, the lower sheet 120 is preferably shaped as shown in Figure 5, thus having an outer gripping appendage 120F.

With reference now to Figure 4, it can be seen that the shape of the inner surface of the rim or frame 120A is modified in comparison with Figure 3 and, in this embodiment (as indicated by the reference 120G) has an upwardly concave curvature. In fact, the size of the portion 120E of waste material is thus reduced in comparison with the solution of Figure 3, but without a substantial reduction in the vertical component of the force acting between the lateral surface of the frame 120A and the side of the slab of stoney material.

With the solutions according to the present invention considered up to now, the following advantages are achieved:

- (1) the upper sheet is clean after detachment from the hardened slab;
- (2) the lower sheet is also substantially clean and, above all, free of deposits of mixture after removal of the slab;
- (3) the pressure plate of the press no longer has to be equipped with the peripheral rim or frame for restraining the upper sheet so that its peripheral edge meets that of the lower sheet;
- (4) changing of the size of the slab is simplified since it suffices to change the dimensions of the lower sheet without altering the plate of the vibratory compaction press.

Figures 6, 7 and 8 illustrate further variants of the present invention. In the solution shown in Figure 6, the upper and lower sheets are formed as mirror images of one another so that the empty space or cavity is formed in the region of the horizontal median plane of the layer of mixture.

In this embodiment, an accurate selection of the dimensions of this space and, in particular, of its depth, in fact enables an adequate pressing action to be maintained but at the same enables the thin peripheral flash which, in this embodiment, would be disposed along the median plane, to be reduced.

Naturally, in Figure 6, the reference numerals relating to the upper sheet have been supplemented by those of parts corresponding to parts of the lower sheet in the version of Figure 3.

In the variant of Figure 7, on the other hand, there is provision for the insertion of an additional insert 110 which is fixed to the lower surface of the upper sheet in the region in which the peripheral flash would otherwise form. In this embodiment, the thickness of the insert 110, which is preferably made of rubber, particularly soft rubber, is also calculated so as to permit adequate pressing but at the same time to prevent the formation of the aforementioned flash.

To provide an order of magnitude for this thickness, it should be of the order of 2mm.

As can also be seen in Figure 7, it is preferable for the inner surface of the insert 110 to be inclined slightly outwardly so as to favour the detachment of the upper sheet 132.

The solution shown in Figure 8, however, relates to the possibility of forming suitable recesses or even holes having specific purposes in the final slab. A typical case is that of so-called kitchen "worktops" (support slabs or surfaces) which require holes for the fixing of utensils or recesses for fixing to underlying units.

In this case, in the solution shown, a projection 120H of a height equal to that of the rim or frame 120A of the lower sheet 120 extends upwards from the flat base 120B of the said lower sheet 120, thus forming a second cavity 100A.

This technique may be used, for example, to form decorative designs or even writing on the visible face of the final slab.

Finally, it is also possible by means of the present invention to produce slabs already divided into a plurality of smaller tiles or blocks.

For this purpose, as shown in Figures 9-11, one of the two sheets, preferably the lower one, carries a lattice-like structure 120L projecting from the base 120B.

The final sheet will thus automatically be divided into a plurality of uniform blocks which are separate from the outset or are joined by a very thin connecting flash which can easily be removed in the course of the usual finishing operations.

The invention has been described with reference to preferred embodiments thereof, upon the understanding that conceptually and mechanically equivalent modifications and variations are possible and foreseeable without departing from the scope thereof.

### CLAIMS

1. Method of producing slabs made of granulated stone materials and/or sand bound with a hardenable resin, of the type in which a mixture of granulated stone material and/or sand and hardenable resin is spread on a support so as to form a layer of substantially uniform thickness, the support being protected by a sheet material interposed between the upper surface of the support and the layer of mixture, the support is transferred to a station for vibratory compaction under vacuum, care being taken to protect the upper surface of the layer of mixture with a sheet material superimposed on the layer before it reaches the station and, after the vibratory compaction under vacuum, the support with the layer of compacted mixture is transferred to a hardening station, the said sheet material also being highly resilient, characterized in that the flat configuration of the lower sheet is replaced by a shaped configuration comprising a flat base and a peripheral frame projecting from the said flat base for a predetermined height so as to define a seat of dimensions corresponding in plan to those of the slab to be produced, the aforementioned peripheral frame having a height which is lower by a predetermined amount than that of the final slab to be produced so that, after compaction, a space of predetermined depth remains between the peripheral edge of the upper sheet and the top of the aforementioned frame.
2. Method according to Claim 1, characterized in that the lower sheet is constituted by a cloth of inextensible fabric covered with a layer of rubber on both sides.
3. Method according to Claim 2, characterized in that the cloth of inextensible fabric is subjected to a pretensioning treatment before being covered with the layers of rubber.
4. Method according to Claim 1, characterized in that the rubber which covers the said inextensible cloth can withstand temperatures of between 80 and 150°C and chemical agents.
5. Method according to Claim 1, characterized in that the said upper sheet has a configuration which is a mirror image of that of the said lower sheet so that the said empty space or cavity is located in the vicinity of the horizontal median plane of the final slab.
6. Method according to Claim 1, characterized in that an insert is fixed to the lower surface of the said upper sheet in order partially to fill the empty cavity or space formed between the peripheral edges of the said lower and upper sheets when they enclose a metered quantity of mixture.
7. Method according to Claim 1, characterized in that projections extend from the said flat base of the lower sheet and/or from the surface of the said upper sheet which comes into contact with the said mixture in order to form recesses or holes in the finished slab.

8. Method according to Claim 1, characterized in that, in order to produce slabs already divided into a plurality of blocks or tiles, one of the two sheets, preferably the lower one, carries a lattice-like structure projecting from the surface facing towards the mixture.
9. Shaped sheet usable for the production of slabs from a mixture constituted by granulated stone material and/or sand and by a binding resin according to the method of Claim 1, characterized in that it comprises a flat base and a peripheral frame projecting from the said flat base for a predetermined height so as to define a seat of dimensions corresponding in plan to those of the slab to be produced, the said predetermined height being lower by a predetermined amount than that of the final slab to be produced so that, after compaction, a space of predetermined depth remains between the peripheral edge of the upper sheet and the top of the aforementioned frame.
10. Shaped sheet according to Claim 9, characterized in that the said rim or frame has an inner surface, inclined at an angle of less than  $90^\circ$  to the vertical plane, for contact with the said mixture deposited on the flat base.
11. Shaped sheet according to Claim 10, characterized in that the said inclination of the said contact surface is between  $45$  and  $90^\circ$ .
12. Shaped sheet according to Claim 9, characterized in that the said rim or frame has an upwardly concave curved inner surface for contact with the said mixture.
13. Shaped sheet according to Claim 9, characterized in that it has a composite structure constituted by a cloth of inextensible material covered with a layer of rubber on both sides.
14. Shaped sheet according to Claim 13, characterized in that the said cloth of inextensible material is subjected to a pretensioning treatment.
15. Shaped sheet according to Claim 9, characterized in that a flat appendage which can be gripped by pincer pulling and transfer means is provided along at least one side of the sheet.
16. Shaped sheet according to Claim 9, characterized in that, in order to form slabs divided in advance into a plurality of tiles or blocks, a lattice-like structure is provided, projecting from the surface of at least one of the said sheets facing the mixture.
17. Shaped sheet according to Claim 9, characterized in that projections for forming recesses or holes in the finished slab extend from the said flat base of the said lower sheet which contacts the said mixture.

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Fig. 1

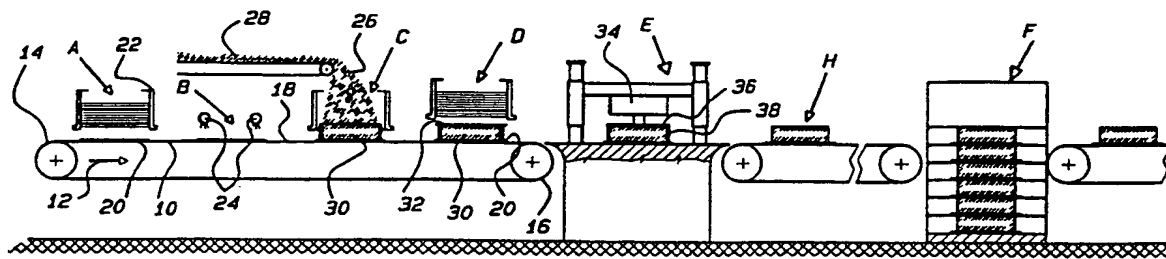


Fig. 2

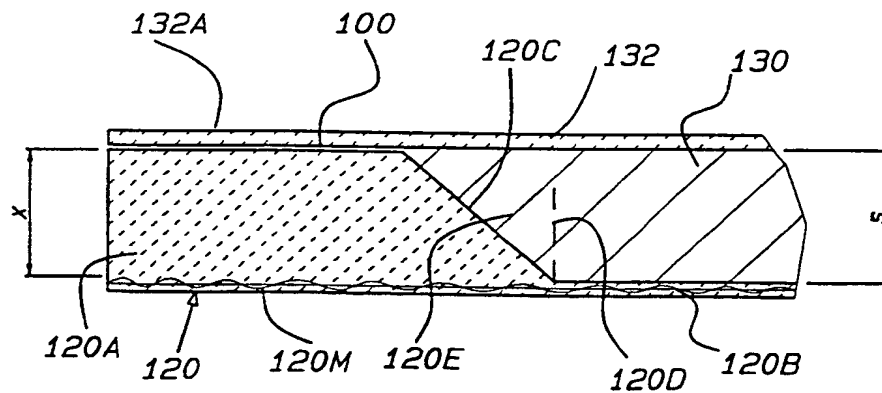
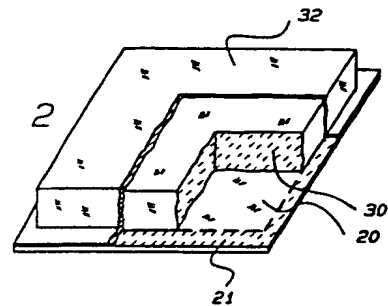


Fig. 3

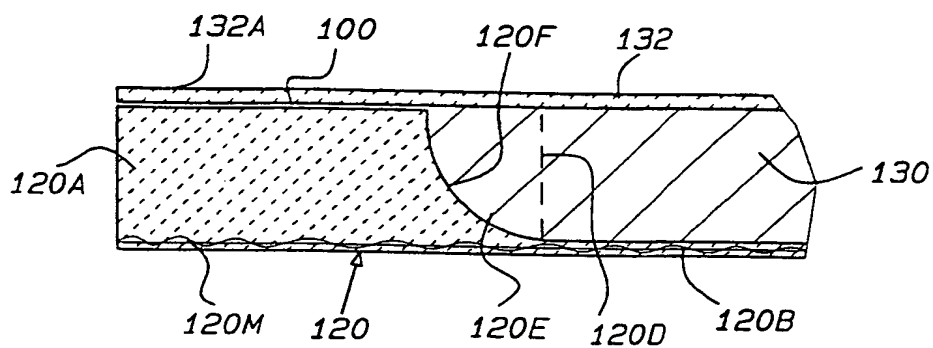


Fig. 4



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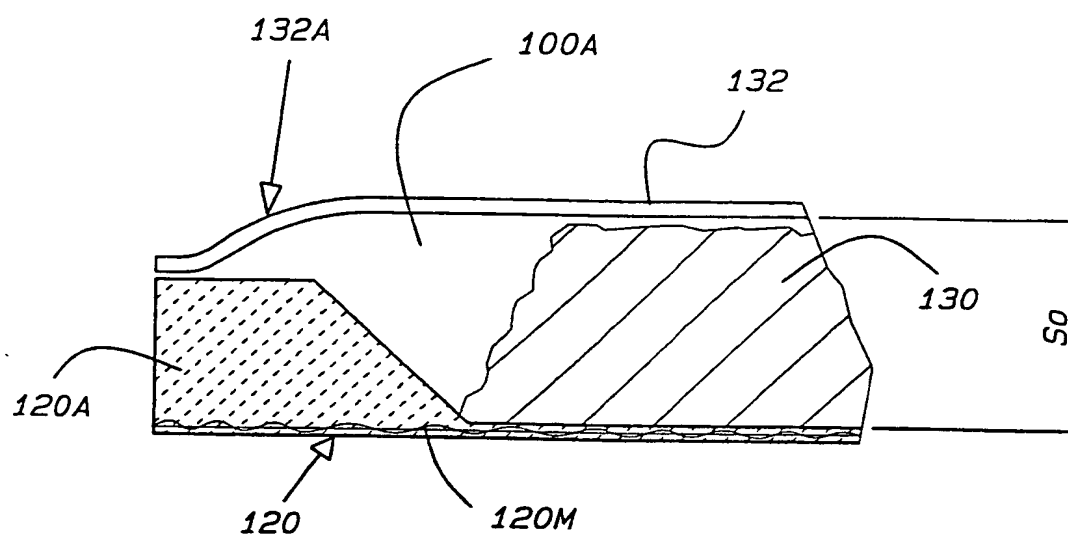
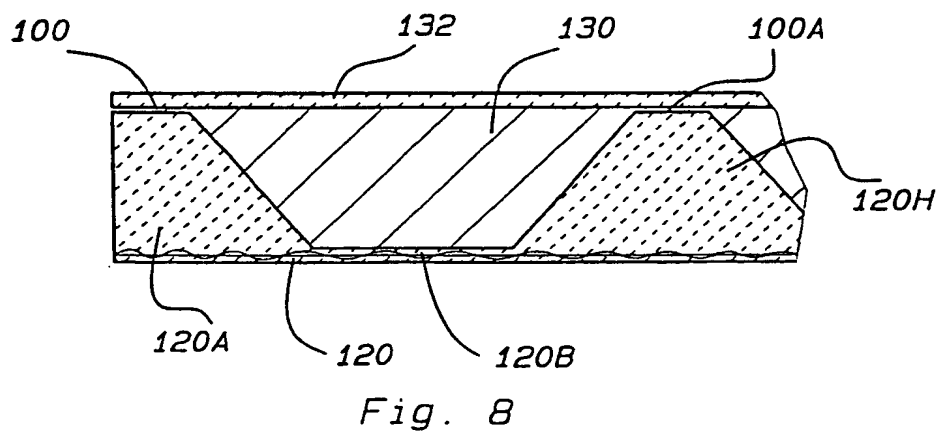
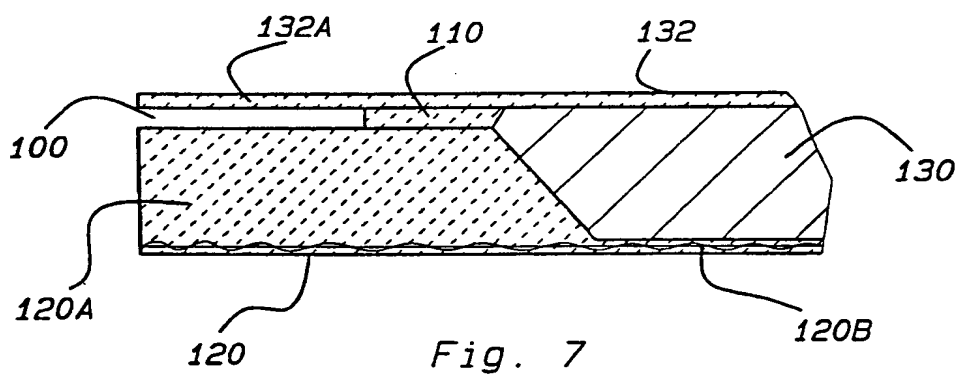
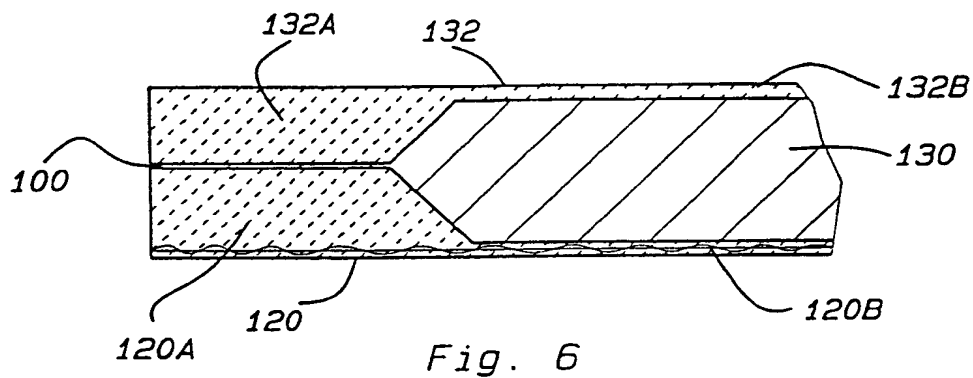
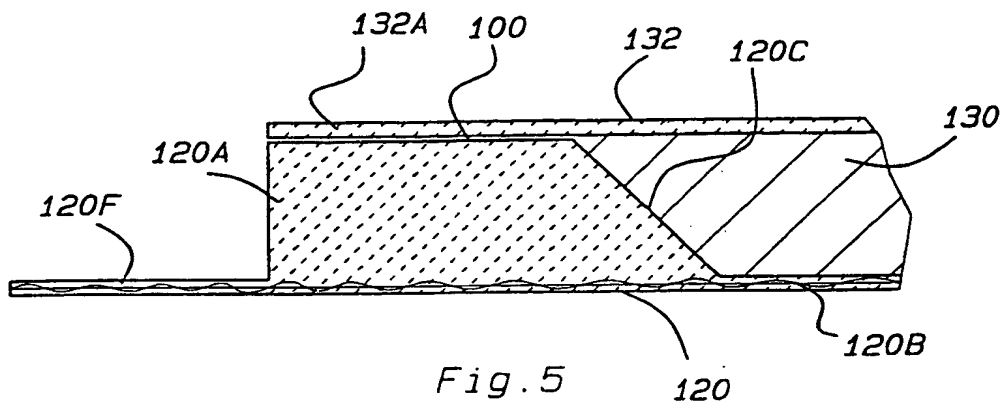


Fig. 3A

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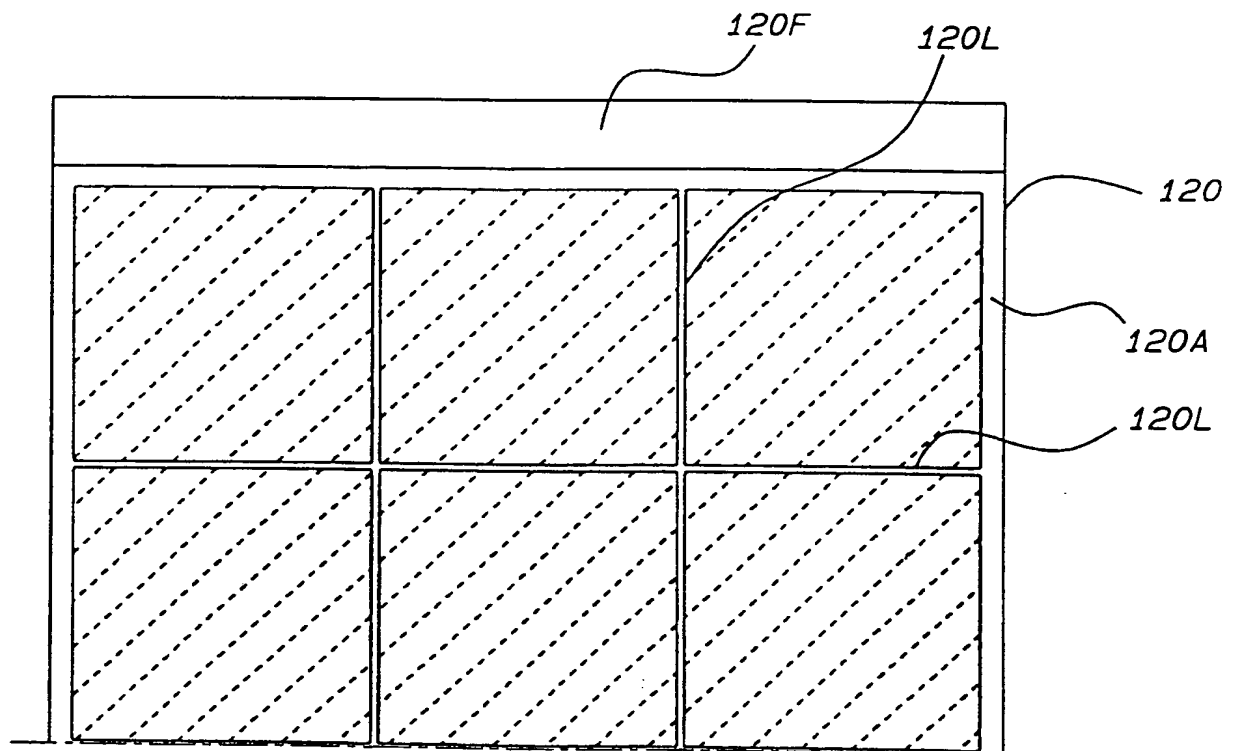
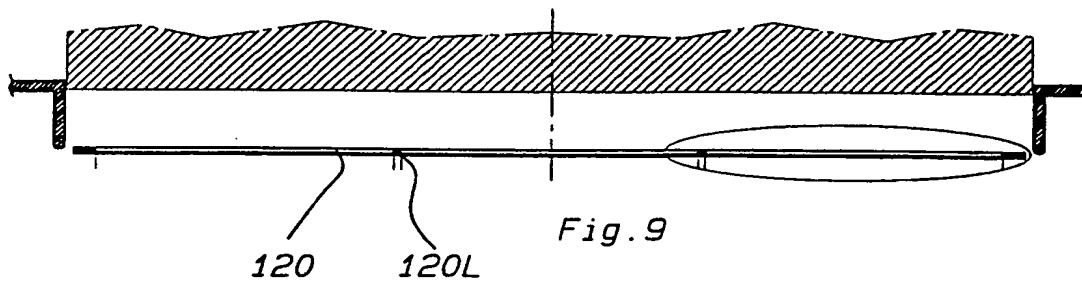


Fig. 10

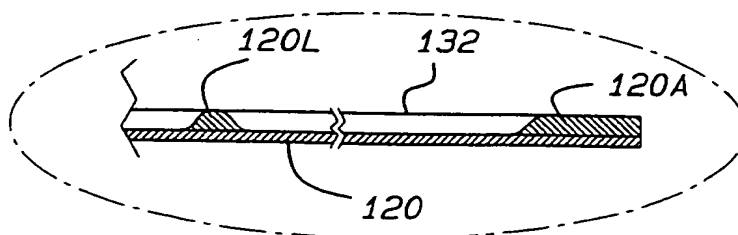


Fig. 11

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 98/06984

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B29C67/24

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 786 325 A (TONCELLI MARCELLO) 30 July 1997 cited in the application see the whole document ---	1,2,4,9, 13
A	FR 1 496 341 A (L. R. MANGRUM) 21 December 1967 see the whole document see page 6, column 2, line 12 - page 6, column 2, line 45 see page 7, column 1, line 43 - page 7, column 1, line 54 see figure 5 ---	1,9
A	WO 92 10349 A (DRAZIL JAROMIR VACLAV) 25 June 1992 see the whole document -----	1,8,9,16

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

1 April 1999

Date of mailing of the international search report

12/04/1999

Name and mailing address of the ISA

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Authorized officer

Gourier, P

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 98/06984

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0786325	A	30-07-1997	IT	TV960007 A	29-07-1997
			CA	2196119 A	30-07-1997
FR 1496341	A	21-12-1967	BE	688015 A	10-04-1967
			NL	6614171 A	18-05-1967
WO 9210349	A	25-06-1992	AU	9042591 A	08-07-1992

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>TV980T101E</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/EP 98/ 06984</b>	International filing date (day/month/year) <b>21/10/1998</b>	(Earliest) Priority Date (day/month/year) <b>27/10/1997</b>
Applicant <b>TONCELLI, Luca</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP 98/ 06984

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

## MODIFICATIONS IN THE FOLLOWING LINES OF THE TEXT:

Line 3: ...mixture (20)...

Line 4: ...support (20), the said support (20)...

Line 5: ...base (120b)...

Line 6: ...frame (120a) projecting from the flat base (120b)...

Line 8: ...peripheral (120a)...

Line 9: ...sheet (132)...

Line 10: ...mixture (26), a space (100a)...